

2.5 How Can Two Varieties of Plants Be Combined to Produce a New Variety?

Read pages 66 and 67

Plan

Procedure

1. First, assume that the white trait is dominant and use W to represent the dominant allele.
 - a. If white rice is dominant, how many genotypes can it have? Why?
 - b. If white rice is dominant, what will be the genotype or genotypes of red rice?
2. Draw as many Punnett squares as you need to cross white rice (as dominant allele) and red rice (as a recessive allele).

WHITE TRAIT DOMINANT

3. Look at the possible offspring from your Punnett squares. Were any of the offspring white? If you have any white offspring, circle those in your Punnett squares. Save your Punnett squares to compare with the data from the field experiment.

4. Now, assume that the white trait is recessive and the red trait is dominant, use R to represent the dominant and r to represent the recessive allele.
- If white rice is recessive, how many genotypes can it have? Why?
 - If white rice is recessive what will be the genotype or genotypes of red rice?
5. Draw as many Punnett squares as you need to cross white rice (as a recessive allele) and red rice (as a dominant allele). Be sure to label your Punnett squares "white trait recessive."

WHITE TRAIT RECESSIVE

6. Look at the possible offspring from your Punnett squares. Were any of the offspring white? If you have any white offspring, circle those in your Punnett squares. Save your Punnett squares to compare with the data from the field experiment.

Stop and Think



1. Once the first generation of rice plants is grown, you will be able to see the seeds that were produced by your crossings. What will you be able to tell from these seeds? How will you determine if white is dominant or recessive? Describe how it might be possible for the rice to be red but have alleles for white or be white and have alleles for red?
2. How could you use one more generation to get a better idea of the genotypes of each of the seeds you could get from the first generation? Remember to use Punnett squares to try out different ideas and be sure to label them.



Criteria and Constraints

Criteria and constraints are very important because they will help you develop your procedure. Make a table of the criteria and constraints for this investigation on the Rice Field Procedure Planning page. Discuss the criteria and constraints with your group. List as many as you can on the worksheet.

Procedure and Data

The farmers will carry out the procedure you send them. To do this, they will need accurate and detailed instructions. Discuss the following questions with a partner at the table:

- ∞ How the farmers will carry out the cross-pollination (Think specifically about how to cross the pollen and ovules.
- ∞ How they should plant the seeds
- ∞ What data they should record
- ∞ How many generations of rice plants they should grow and why